Volunteer Lake Assessment Program Individual Lake Reports

HIGHLAND LAKE, STODDARD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	19,008	**Max. Depth (m):**	9.6	**Flushing Rate (yr^{-1})**	10.3
Surface Area (Ac.):	712	**Mean Depth (m):**	1.6	**P Retention Coef:**	0.49
Shore Length (m):	25,300	**Volume (m^3):**	4,721,000	**Elevation (ft):**	1294

TROPHIC CLASSIFICATION

Year	Trophic class
1993	MESOTROPHIC
2004	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

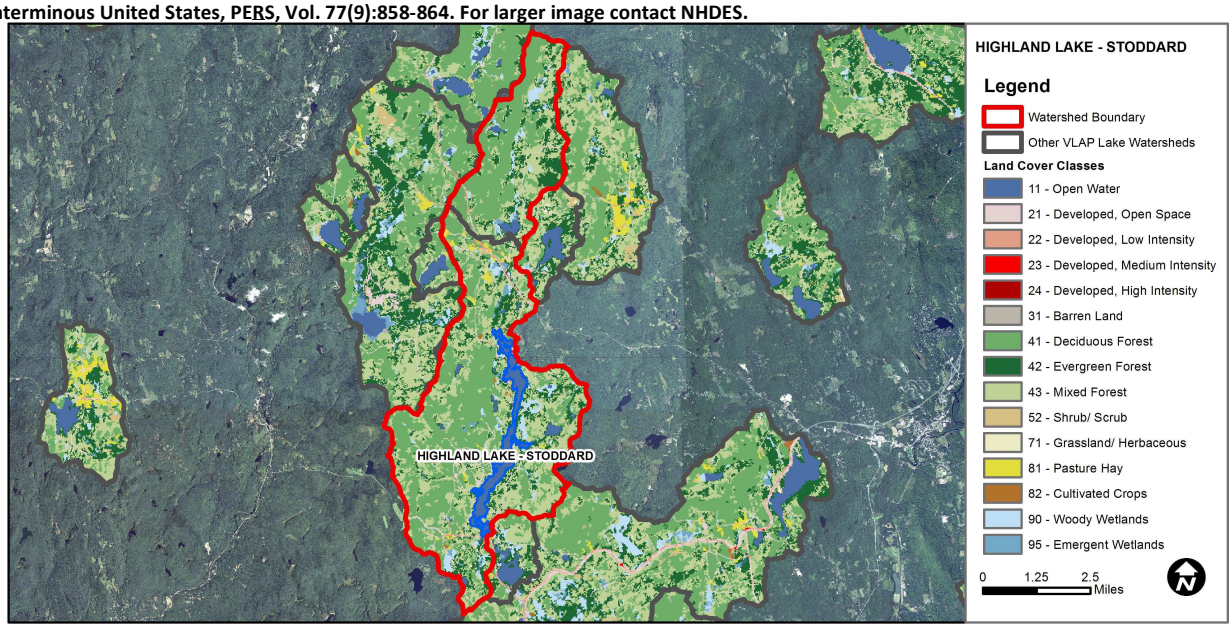
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	D.O. (mg/L)	Very Good	At least 10 samples with 0 exceedances of criteria.
	D.O. (% sat)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

HIGHLAND LAKE-HIGHLAND LAKE BOAT LAUNCH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	5.2	Barren Land	0	Grassland/Herbaceous	0.05
Developed-Open Space	2.58	Deciduous Forest	39.23	Pasture Hay	0.92
Developed-Low Intensity	0.59	Evergreen Forest	15.01	Cultivated Crops	0.1
Developed-Medium Intensity	0.01	Mixed Forest	31.25	Woody Wetlands	3.49
Developed-High Intensity	0	Shrub-Scrub	0.58	Emergent Wetlands	0.91

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
HIGHLAND LAKE, NORTH STN, STODDARD, NH
2012 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphic)*

- **CHLOROPHYLL-A:** Chlorophyll levels decreased slightly as the summer progressed and were relatively low. Historical trend analysis indicates a significantly decreasing (improving) chlorophyll level since 2001. We hope to see this continue!
- **CONDUCTIVITY/CHLORIDE:** Conductivity levels were low and below the NH lake median.
- **TOTAL PHOSPHORUS:** Tributary phosphorus levels were relatively low throughout the summer. Epilimnetic (upper water layer) phosphorus levels were low and decreased from 2011. Historical trend analysis indicates phosphorus levels tend to fluctuate from year to year. Hypolimnetic (lower water layer) phosphorus levels increased as the summer progressed with increasing turbidity.
- **TRANSPARENCY:** Transparency increased slightly as the summer progressed likely due to the gradual decrease in algal growth. Transparency improved from 2011 and historical trend analysis indicates a relatively stable transparency trend.
- **TURBIDITY:** Turbidity levels were low except in the Hypolimnion where they increased throughout the summer.
- **PH:** pH was relatively low and can be critical to aquatic life.
- **RECOMMENDED ACTIONS:** The lower phosphorus and chlorophyll levels and increased transparency may have been associated with the drier summer and lack of stormwater runoff. Educate watershed residents on ways to reduce stormwater runoff from their properties utilizing DES' "NH Homeowner's Guide to Stormwater Management" tool.

Dissolved Oxygen & Temperature Profile

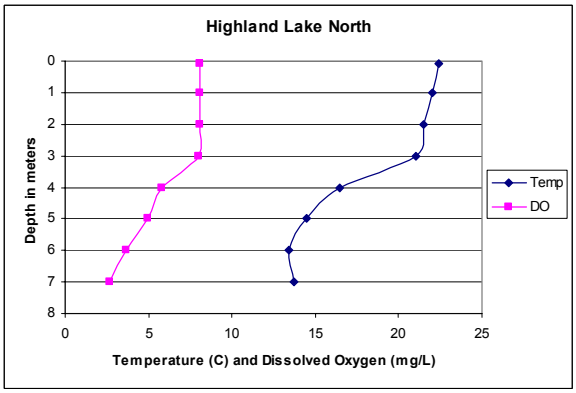


Table 1. 2012 Average Water Quality Data for HIGHLAND LAKE, NORTH STN

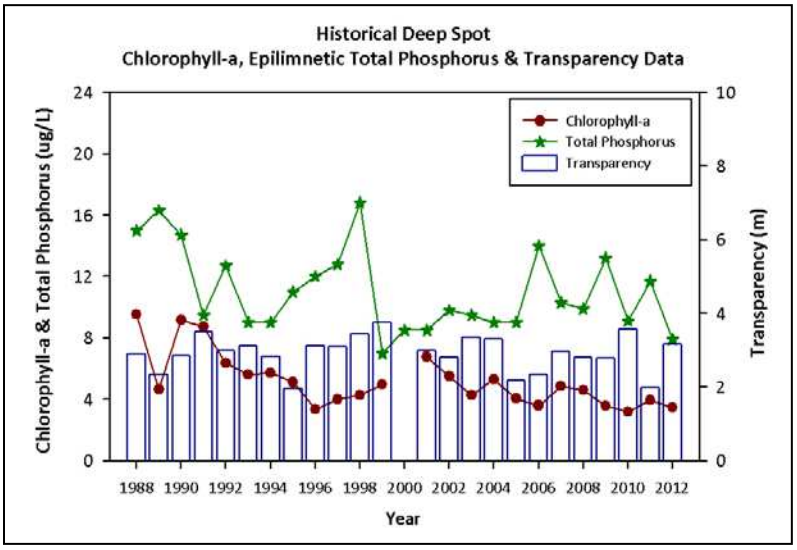
Station Name	Alk.	Chlor-a	Chloride	Cond.	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	ug/l	m		ntu	
						NVS	VS		
Barden Pond Brook			3	25.7	14			0.84	6.41
North Inlet			3	37.4	10			0.62	6.40
Pickerel Cove 2				21.5	11			0.85	6.01
Pickerel Cove Brook			3	22.5	11			0.73	5.87
Epilimnion	2.03	3.48	3	27.2	8	3.16	3.35	0.66	6.20
Metalimnion				27.6	9			0.88	6.14
Hypolimnion				33.7	16			4.16	5.79

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation
Chlorophyll-a	Improving	Significantly decreasing chlorophyll level.
Transparency	Stable	Data not significantly increasing or decreasing.
Phosphorus (epilimnion)	Variable	Data fluctuate annually, but are not significantly increasing or decreasing.



This report was generated by the NH DES Volunteer Lake Assessment Program (VLAP). For more information contact:
Sara Steiner
PO Box 95
Concord, NH 03302-0095
(603) 271-2658
sara.steiner@des.nh.gov